

**RESPONSE AND AMENDMENT**  
**United States Patent Application No. 09/981,024**

**Listing of Claims**

1. (Original) A method for depositing an epitaxial thin film having the quaternary formula YCZN wherein Y is a Group IV element and Z is a Group III element on a substrate at temperature between ambient temperature and 1000°C in a gas source molecular beam epitaxial chamber, comprising introducing into said chamber:
  - i. gaseous flux of precursor H<sub>3</sub>YCN wherein H is hydrogen or deuterium; and
  - ii. vapor flux of Z atoms; under conditions whereby said precursor and said Z atoms combine to form epitaxial YCZN on said substrate.
2. (Original) The method of Claim 1 wherein said temperature is about 550°C to 750°C.
3. (Original) The method of Claim 1 wherein said substrate is silicon or silicon carbide.
4. (Original) The method of Claim 3 wherein said substrate is Si(111) or  $\alpha$ -SiC(0001).
5. (Original) The method of Claim 3 wherein said substrate is a large-diameter silicon wafer.
6. (Original) The method of Claim 5 wherein said silicon wafer comprises Si(111).
7. (Original) The method of Claim 4 wherein said substrate is  $\alpha$ -SiC(0001) comprising the additional step of cleaning said substrate prior to deposition of said quaternary film.

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8. (Original) The method of Claim 7 wherein said cleaning step comprises hydrogen etching.

9. (Currently amended) The method of Claim 1 wherein said substrate is Si(111) comprising a buffer layer, and said epitaxial ~~semiconductor~~ YCZN is deposited on said buffer layer.

10. (Currently amended) The method of Claim 7 9 wherein said buffer layer is a Group III nitride.

11. (Currently amended) The method of Claim 8 10 wherein said buffer layer is AlN.

12. (Canceled)

13. (Canceled)

14. (Original) The method of Claim 1 wherein Y is silicon, germanium or tin.

15. (Original) The method of Claim 1 wherein Z is aluminum, gallium or indium.

16. (Original) The method of Claim 1 wherein Z is boron.

17. (Original) The method of Claim 1 for depositing thin film YCZN wherein Y is silicon and said precursor is H<sub>3</sub>SiCN.

18. (Original) The method of Claim 1 for depositing the thin film YCZN wherein Y is germanium and said precursor is H<sub>3</sub>GeCN.

19. (Original) The method of Claim 1 for depositing epitaxial thin film SiCZN on a substrate wherein said precursor is H<sub>3</sub>SiCN, said Z atom is aluminum and said substrate is Si(111) or  $\alpha$ -SiC(0001).

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20. (Original) The method of Claim 1 for depositing epitaxial thin film GeCZN on a substrate wherein said precursor is D<sub>3</sub>GeCN, said Z atom is aluminum and said substrate is Si(111) or  $\alpha$ -SiC(0001).

21-33. (Canceled)

34. (Currently amended) The method of Claim 1 for depositing epitaxial thin film having the formula (YC)<sub>(0.5-x)</sub>(ZN)<sub>(0.5+x)</sub> wherein x is chosen to be a value  $0 < x \leq 0.5$ , and Z is the same or different in each occurrence, comprising in addition the step of introducing into said chamber a flux of nitrogen atoms and maintaining the flux of said precursor, said nitrogen atoms and said Z atoms at a ratio selected to produce quaternary semiconductors having said chosen value of x.

35-45. (Canceled)